AES001 Inspection Report

January 7, 2008

We observed the interior surface of the cavity AES001, mainly the equator and iris region, with our camera inspection system. We found three spots at the equator region of #3 cell and one spot at the equator region of #7 cell: the cells are numbered from the input power coupler side. The diameters of all the four spots were about 500μm. The azimuthal positions of the three spots found at #3 cell were 168, 169 and 181deg: the angle is measured clockwise from the input power coupler. These positions seem to be correlated with the positions of the hot spots found in the cernox measurement at FNAL/JLAB.

The wall gradients($-22.5\,\mathrm{deg} < \arctan(dR/dZ) < 22.5\,\mathrm{deg}$) of the four spots were measured with the stripe illumination method [*1]. This measurement shows that the all three spots found at #3 cell are convex(ball) and the spot found at #7 cell is concave(pit). The height of one of the three balls of #3 cell was estimated by integrating the wall gradient. The depth of the pit of #7 cell was also estimated in the same way. The estimated height of the ball is about 40μm. The estimated depth of the pit is about 30μm.

[*1] see my report:http://wwwal.kuicr.kyoto-u.ac.jp/ tajima/cavcam/REPORTS/report071204.pdf

1 #3 cell

The three spots found at the equator region of #3 cell were shown in Fig. 1 and 2. The wall gradients measured by the stripe illumination method are shown in Fig. 3, 4 and 5. The three spots all seems to be balls.

We can apply the height/depth estimation only to the spot in Fig 2(not that in Fig. 1), because we estimete the height/depth of spots by integrating its measured wall gradient. That is to say, the reflecting region needs to be distributed continuoslly in a belt shape. The estimated height of the spot in Fig. 2 are shown in Fig. 6. From this estimation, the height of the ball is 43μm.

The reflecting region of the two spots in Fig. 1 are dark. These may indicate some contaminations. In this case, only the polarity of the local curvature can be shown.

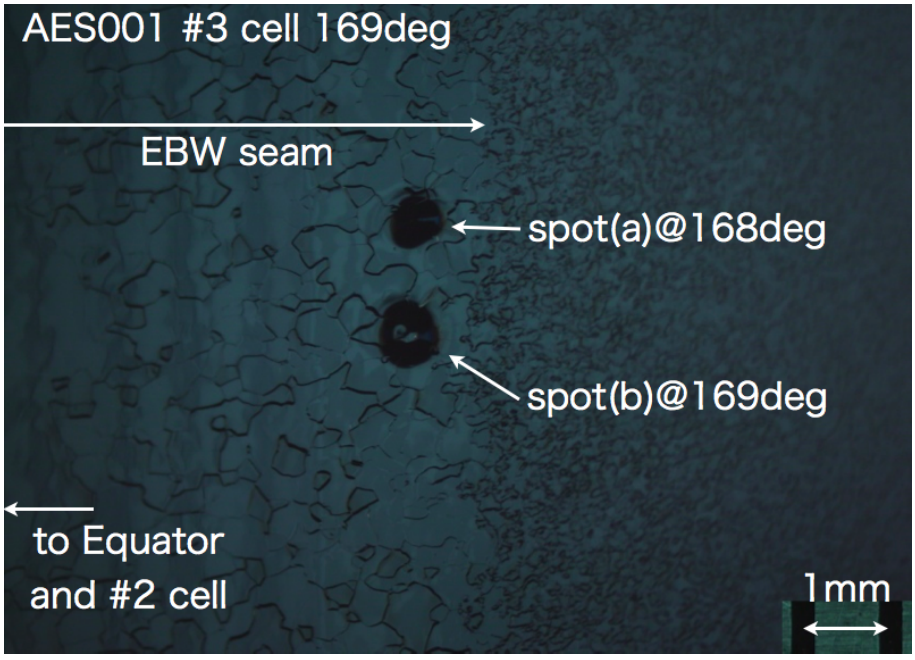

Fig. 1 Spots found at the equator region of #3 cell. The azimuthal position of the spot(a) is 168deg and the spot(b) is 169deg. The angle was measured clockwise from the input power coupler. The larger grain size of the left half of the picture indicate an area of the EBW seam.

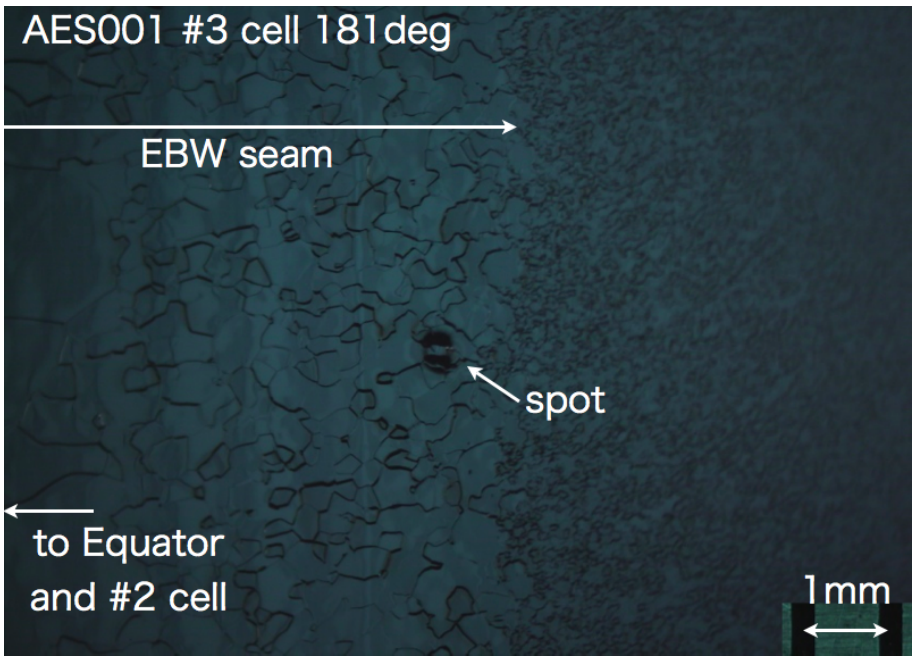

Fig. 2 Spot found at the equator region of #3 cell, 181deg. The size of the spot is about 500μm.

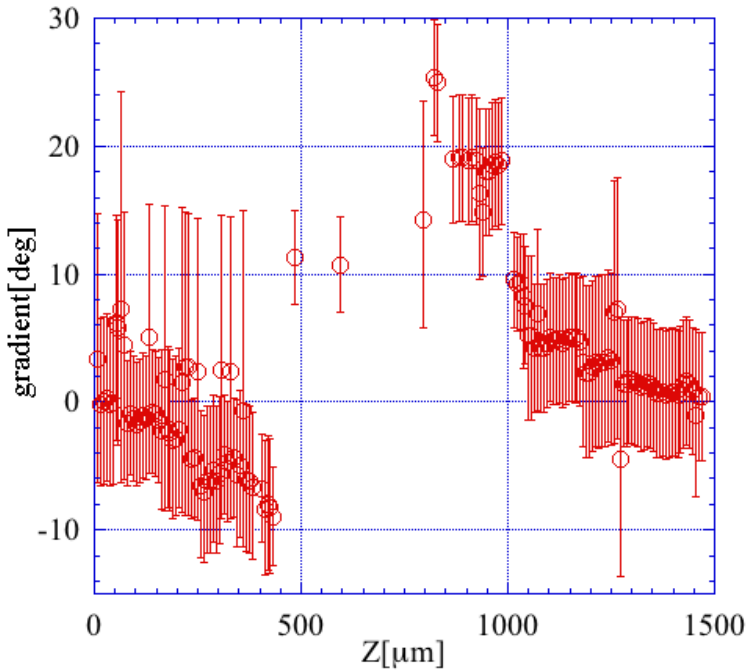

Fig. 3 Wall gradient of the spot(a) shown in Fig. 1. This wall gradient was measured by the stripe-like illumination method.

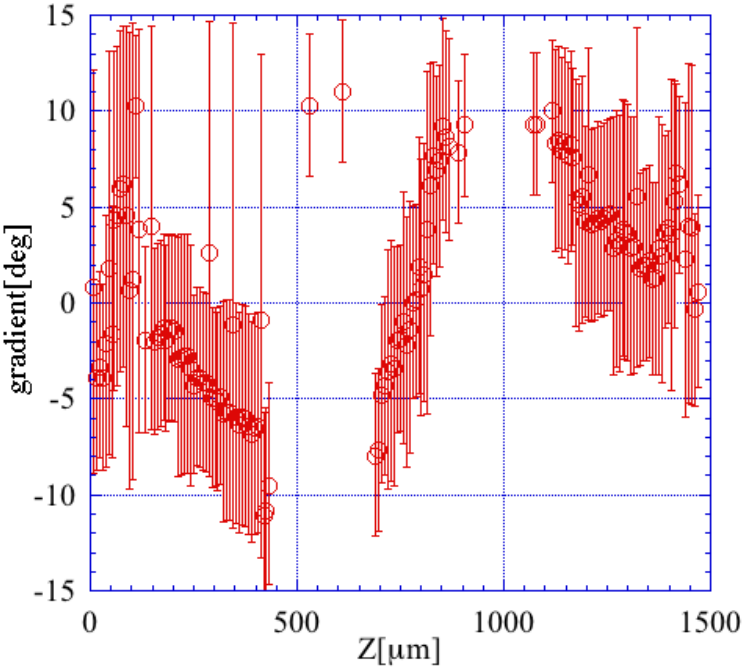

Fig. 4 Wall gradient of the spot(b) shown in Fig. 1.

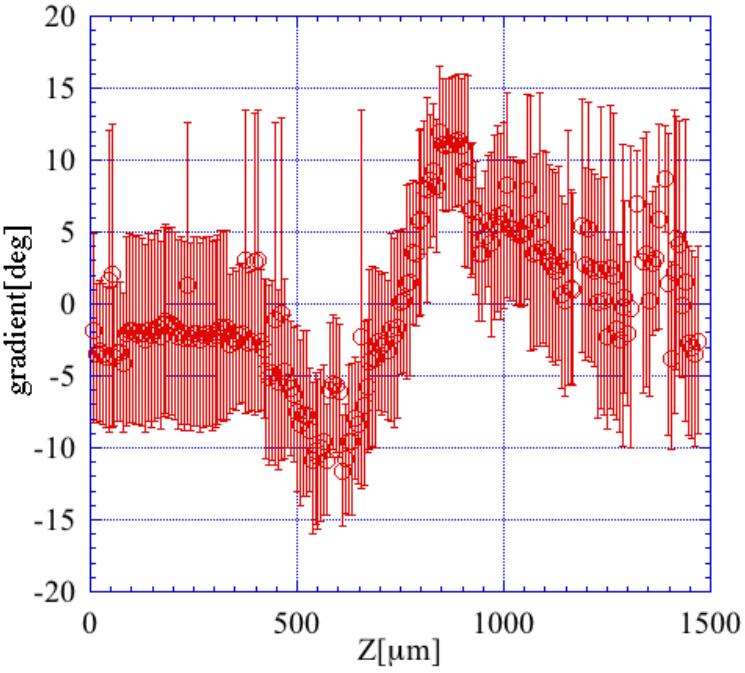

Fig. 5 Wall gradient of the spot shown in Fig. 2.

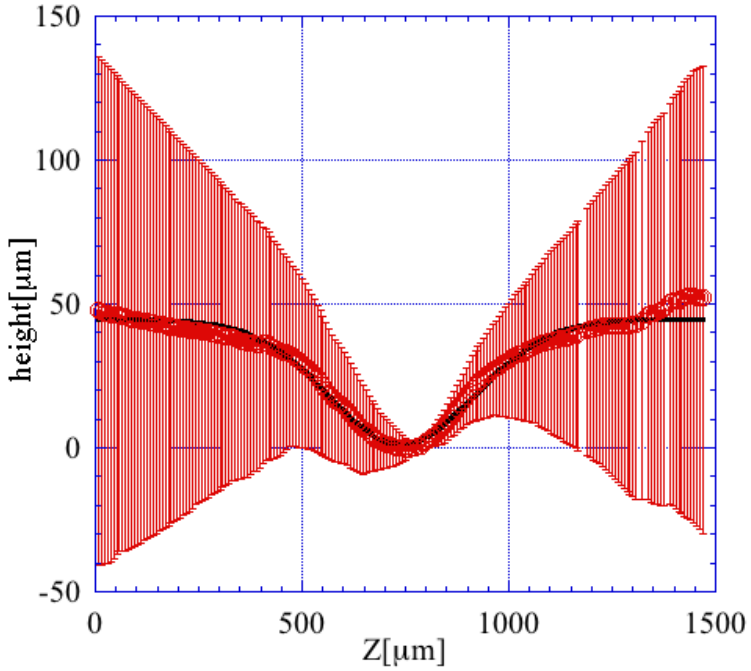

Fig. 6 Height of the ball shown in Fig. 2. The black curve shows a fitted gaussian. From this data, the height of the ball is estimated to be 43μm.

2 #7 cell

We found a spot at the equator region of #7 cell(Fig. 7). The diameter of the spot is about 500μm. From the wall gradient measured by the stripe illumination method, this spot seems to be a pit(Fig. 8). When all the stripes are on, an illuminating belt appears across the diameter of the spot in logitudinal direction. The reflecting region of this pit moved along the belt when the position of illuminating region were changed. We could estimate the depth of the pit. The resulted depth of the pit is 26μm(Fig. 9).

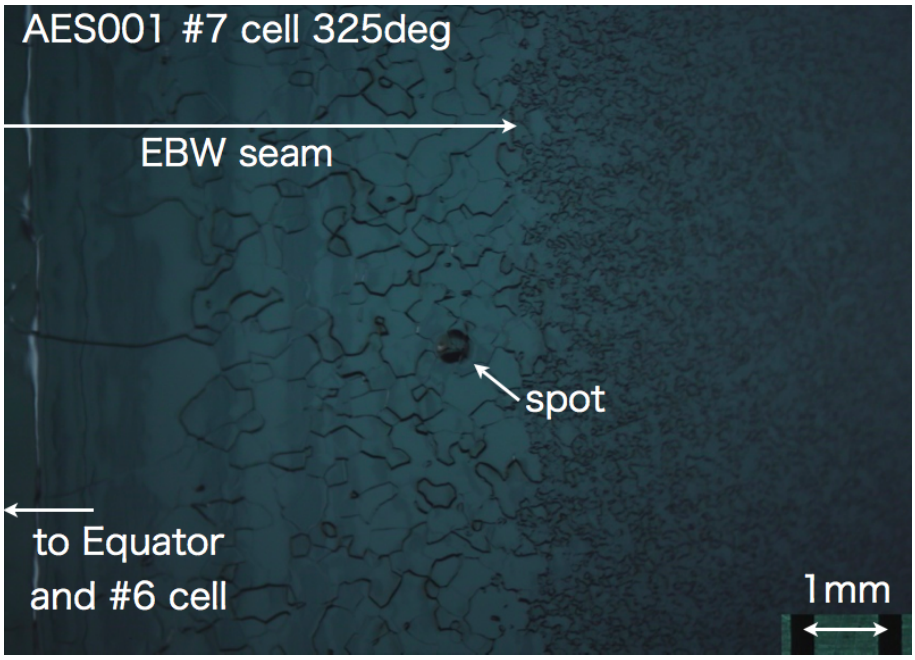

Fig. 7 Spot found at the eqator region of #7 cell.

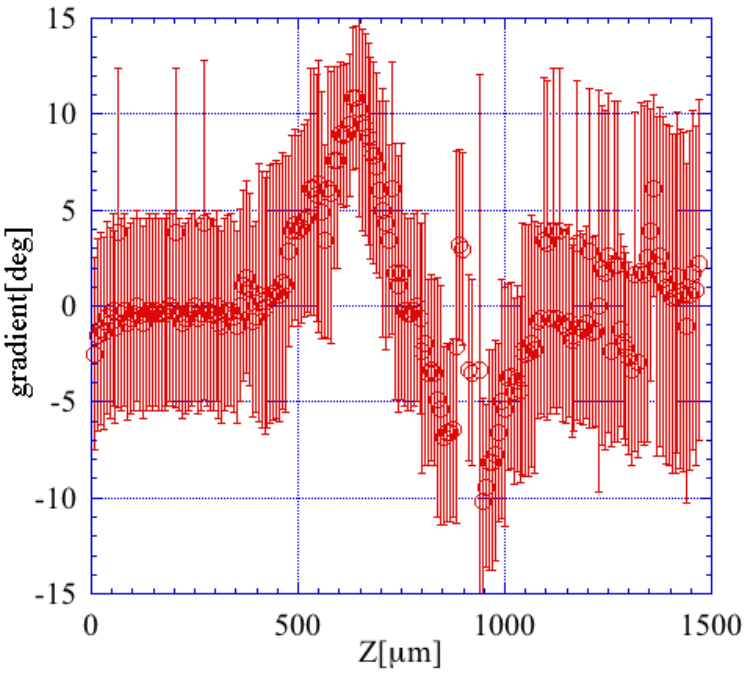

Fig. 8 Wall gradient of the spot in Fig. 7. This curve shows that the spot is a pit.

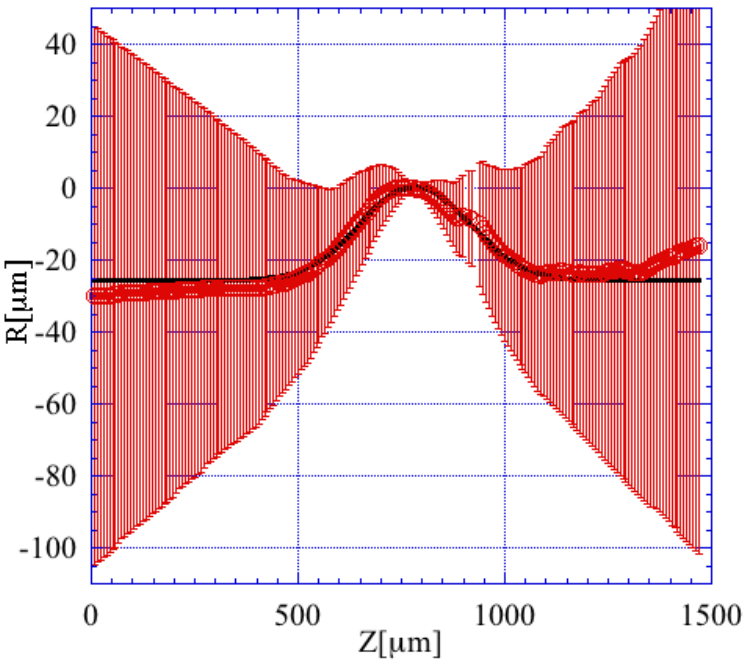

Fig. 9 Depth of the pit in Fig. 7. The black curve shows a fitted gaussian. The depth of this pit is 26μm.